AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-6 (Canceled)

7. (Currently Amended) The method of claims 142 or 13, ~~1~~ wherein the characteristic peaks are determined by computing the ~~further comprising computing the~~ variance of the diffraction patterns.

Claims 8-10 (Canceled)

11. (Currently Amended) The method of claim 142 ~~10~~, wherein determining the similarities based on the peaks comprises:

detecting crystalline peaks in the diffraction patterns; and

matching the diffraction patterns based on the detected crystalline peaks.

12. (Currently Amended) The method of claim 142 ~~10~~, wherein determining the similarities based on the peaks comprises:

detecting amorphous peaks in the diffraction patterns; and

matching the diffraction patterns based on the detected amorphous peaks.

13. (Currently Amended) The method of claim 142 ~~10~~, wherein the ~~detecting~~ characteristic peaks are detected by a method comprising ~~further comprises~~ :

determining the characteristic peaks of the diffraction patterns;

assigning probability scores to the determined characteristic peaks of the diffraction pattern; and

discretely allocating the determined characteristic peaks into one or more groups based on the assigned probability scores.

14. (Currently Amended) The method of claim 142 ~~10~~, wherein determining the first similarity ~~matching the diffraction patterns further~~ comprises comparing one or more

detected characteristic peaks in the first diffraction pattern with one or more detected characteristic peaks in the second diffraction pattern.

15. (Currently Amended) The method of claim 13 or 157, wherein discretely allocating the determined characteristic peaks comprises discretely allocating the determined characteristic peaks into a first, a second, a third, and a fourth group based on the assigned probability scores.

16. (Currently Amended) The method of claim 15, wherein determining the similarities ~~matching the diffraction patterns~~ based on the detected characteristic peaks comprises comparing one or more detected characteristic peaks in the first diffraction pattern with one or more detected characteristic peaks in the second diffraction pattern.

17. (Original) The method of claim 16, wherein comparing one or more detected characteristic peaks in the first diffraction pattern with one or more detected characteristic peaks in the second diffraction pattern further comprises:

for each characteristic peak in the first group of the first diffraction pattern, comparing the characteristic peak in the first group of the first diffraction pattern with the characteristic peaks in the first, second, or third group of the second diffraction pattern and penalizing a matching score if the characteristic peak in the first group of the first diffraction pattern is not found in the first, second, or third group of the second diffraction pattern.

18. (Original) The method of claim 17, wherein comparing one or more detected characteristic peaks in the first diffraction pattern with one or more detected characteristic peaks in the second diffraction pattern further comprises:

for each characteristic peak in the second group of the first diffraction pattern, comparing the characteristic peak in the second group of the first diffraction pattern with the characteristic peaks in the first, second, third, or fourth group of the second diffraction pattern and penalizing a matching score if the characteristic peak in the first group of the first diffraction pattern is not found in the first, second, third, or fourth group of the second diffraction pattern.

19. (Original) The method of claim 16, wherein matching the diffraction patterns based on the detected characteristic peaks further comprises comparing one or more detected characteristic peaks in the second diffraction pattern with one or more detected characteristic peaks in the first diffraction pattern.

Claims 20-32 (Canceled)

33. (Currently Amended) The method of claim 142 ~~1~~, further comprising X-shifting the first diffraction pattern prior to determining the similarity between the first diffraction pattern and the second diffraction pattern and determining the similarity between the first diffraction pattern and the third diffraction pattern.

34. (Canceled)

35. (Original) The method of claim 16, wherein comparing the peaks further comprises matching a split peak with a peak having a shoulder as an acceptable match.

Claims 36-141 (Canceled)

142. (Original) A method of analyzing patterns, comprising:

receiving a first diffraction pattern;

receiving a second diffraction pattern;

receiving a third diffraction pattern;

determining a first similarity between the first and the second diffraction patterns based on the characteristic peaks of the first and the second diffraction patterns;

determining a second similarity between the first and the third diffraction patterns based on the characteristic peaks of the first and the third diffraction patterns;

determining a third similarity between the second and the third diffraction patterns based on the characteristic peaks of the second and the third diffraction patterns; and

performing hierarchical cluster analysis on the first, the second, and the third diffraction pattern based on the determined first, the second, and the third similarity.

Claims 143-154 (Canceled)

155. (New) The method of claim 33, wherein the X-shifting is done automatically.

156. (New) A method of analyzing patterns, comprising:

receiving a first diffraction pattern;

receiving a second diffraction pattern;

determining a similarity between the first and the second diffraction patterns based on the characteristic peaks of the first and the second diffraction patterns;

and performing hierarchical cluster analysis on the first and second diffraction pattern based on the determined similarity.

157. (New) The method of claim 156, wherein the characteristic peaks are detected by a method comprising:

determining the characteristic peaks of the diffraction patterns;

assigning probability scores to the determined characteristic peaks of the diffraction pattern; and

discretely allocating the determined characteristic peaks into one or more groups based on the assigned probability scores.

158. (New) The method of claim 157, wherein discretely allocating the determined characteristic peaks comprises discretely allocating the determined characteristic peaks into more than one group based on the assigned probability scores.